CLAIMS

We claim:

1. A method comprising:

decomposing input data into a plurality of code-blocks;

assigning the plurality of code-blocks, on a code-block basis, to a plurality of MQ coders to code the plurality of code-blocks in parallel to balance, to the extent possible, an amount of coding to be performed by each of the plurality of MQ coders.

2. The method defined in Claim 1 wherein each of the plurality of MQ coders codes, to the extent possible, to same number of coefficients.

3. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, and fourth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, HL_1 and HH_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, HL_1 and HH_1 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, HL_1 and HH_1 subbands of a second set of chrominance subbands; and

the fourth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband, a LH_1 subband of the first set of chrominance subbands, and LH_1 subband of the second set of chrominance subbands.

4. The method defined in Claim 3 wherein the plurality of code-blocks is 4:4:4 data.

5. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, and sixth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, HH_2, and HH_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HH_1 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HH_1 subbands of a second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to HL_1 and LH_1 luminance subbands;

the fifth MQ coder is assigned code-blocks corresponding to HL_1 and LH_1 subbands of the first set of chrominance subbands; and

the sixth MQ coder is assigned code-blocks corresponding to a HL_1 and LH_1 subbands of the second set of chrominance subbands.

6. The method defined in Claim 5 wherein the plurality of code-blocks is 4:4:4 data.

7. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, sixth, seventh, and eighth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3 luminance subbands and an HL_1 subband of a first set of chrominance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3 subbands of the first set of chrominance subbands and a HL_1 subband of a second set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, LH_2 and LH_1 subbands of the second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to LH_2, HH_2 and LH_1 luminance subbands;

the fifth MQ coder is assigned code-blocks corresponding to LH_2 and HH_1 luminance subbands and a LH_2 subband of the first set of chrominance subbands;

the sixth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband and LH_2 and HH_2 subbands of the first set of chrominance subbands;

the seventh MQ coder is assigned code-blocks corresponding to a LH_1 subband of the first set of chrominance subbands and LH_2 and HH_2 subbands of the second set of chrominance subbands; and

the eighth MQ coder is assigned code-blocks corresponding to a HH_1 subband of the first set of chrominance subbands and a HH_1 subband of the second set of chrominance subbands.

8. The method defined in Claim 7 wherein the plurality of code-blocks is 4:4:4 data.

9. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, and fourth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HH_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HL_1 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HL_1 subbands of a second set of chrominance subbands; and

the fourth MQ coder is assigned code-blocks corresponding to HL_1 and LH_1 luminance subbands.

10. The method defined in Claim 9 wherein the plurality of code-blocks is 4:2:2 data.

11. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, and sixth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, LH_3, HL_2, LH_2, HH_2 luminance subbands and a LH_2 subband of a first set of chrominance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, LH_3, and HH_2 subbands of a second set of chrominance subbands and a HH_1 luminance subband;

the third MQ coder is assigned code-blocks corresponding to LL_3, LH_3, and LH_2 subbands of the first set of chrominance subbands and a HL_1 subband of the second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to a HL_3, HH_3 and LH_1 luminance subbands and a LH_2 subband of the second set of chrominance subbands;

the fifth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband and LH_3, HH_3 and LH_2 subbands of the second set of chrominance subbands;

the sixth MQ coder is assigned code-blocks corresponding to a HL_3, HH_3, HH_2, and HL_1 subbands of the first set of chrominance subbands.

12. The method defined in Claim 11 wherein the plurality of code-blocks is 4:2:2 data.

13. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, sixth, seventh, and eighth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, and HH_2 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, and HH_2 subbands of a second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to a HL_1 luminance subband;

the fifth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband;

the sixth MQ coder is assigned code-blocks corresponding to a HH_1 luminance subband;

the seventh MQ coder is assigned code-blocks corresponding to a HL_1 subband of the first set of chrominance subbands;

the eighth MQ coder is assigned code-blocks corresponding to a HL_1 subband of the second set of chrominance subbands.

14. The method defined in Claim 13 wherein the plurality of code-blocks is 4:2:2 data.

15. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, and fourth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HH_2, and HL_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to HH_1 luminance subband and LL_3, HL_3, LH_3, HH_3, and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband and LL_3, HL_3, LH_3, HH_3, and HH_2 subbands of a second set of chrominance subbands; and

the fourth MQ coder is assigned code-blocks corresponding to HL_2 and LH_2 luminance subbands, HL_2 and LH_2 subbands of the first set of chrominance subbands, and HL_2 and LH_2 subbands of the second set of chrominance subbands.

16. The method defined in Claim 15 wherein the plurality of code-blocks is 4:1:1 data.

17. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, and sixth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 subbands of a second set of chrominance subbands;

the fourth MQ-coder is assigned code-blocks corresponding to a HL_1 luminance subband;

the fifth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband; and

the sixth MQ coder is assigned code-blocks corresponding to a HH_1 luminance subband.

18. The method defined in Claim 17 wherein the plurality of code-blocks is 4:1:1 data.

19. The method defined in Claim 1 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, sixth, seventh, and eighth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, and HH_2 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3 and HH_2 subbands of a second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to a HL_2 luminance subband, a HL_2 subband of the first set of chrominance subbands, and a HL_2 subband of the second set of chrominance subbands;

the fifth MQ coder is assigned code-blocks corresponding to a LH_2 luminance subband, a LH_2 subband of the first set of chrominance subbands, and a LH_2 subband of the second set of chrominance subbands;

the sixth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband;

the seventh MQ-coder is assigned code-blocks corresponding to a HL_1 luminance subband;

the eighth MQ coder is assigned code-blocks corresponding to a HH_1 luminance subband.

20. The method defined in Claim 19 wherein the plurality of code-blocks is 4:1:1 data.

21. An apparatus comprising:

means for decomposing input data into a plurality of code-blocks;

means for assigning the plurality of code-blocks, on a code-block basis, to a plurality of MQ coders to code the plurality of code-blocks in parallel to balance, to the extent possible, an amount of coding to be performed by each of the plurality of MQ coders.

22. The apparatus defined in Claim 21 wherein each of the plurality of MQ coders codes, to the extent possible, to same number of coefficients.

23. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, and fourth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, HL_1 and HH_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, HL_1 and HH_1 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, HL_1 and HH_1 subbands of a second set of chrominance subbands; and

the fourth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband, a LH_1 subband of the first set of chrominance subbands, and LH_1 subband of the second set of chrominance subbands.

24. The apparatus defined in Claim 23 wherein the plurality of code-blocks is 4:4:4 data.

25. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, and sixth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, HH_2, and HH_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HH_1 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HH_1 subbands of a second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to HL_1 and LH_1 luminance subbands;

the fifth MQ coder is assigned code-blocks corresponding to HL_1 and LH_1 subbands of the first set of chrominance subbands; and

the sixth MQ coder is assigned code-blocks corresponding to a HL_1 and LH_1 subbands of the second set of chrominance subbands.

26. The apparatus defined in Claim 25 wherein the plurality of code-blocks is 4:4:4 data.

27. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, sixth, seventh, and eighth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3 luminance subbands and an HL_1 subband of a first set of chrominance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3 subbands of the first set of chrominance subbands and a HL_1 subband of a second set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, LH_2 and LH_1 subbands of the second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to LH_2, HH_2 and LH_1 luminance subbands;

the fifth MQ coder is assigned code-blocks corresponding to LH_2 and HH_1 luminance subbands and a LH_2 subband of the first set of chrominance subbands;

the sixth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband and LH_2 and HH_2 subbands of the first set of chrominance subbands;

the seventh MQ coder is assigned code-blocks corresponding to a LH_1 subband of the first set of chrominance subbands and LH_2 and HH_2 subbands of the second set of chrominance subbands; and

the eighth MQ coder is assigned code-blocks corresponding to a HH_1 subband of the first set of chrominance subbands and a HH_1 subband of the second set of chrominance subbands.

28. The apparatus defined in Claim 27 wherein the plurality of code-blocks is 4:4:4 data.

29. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, and fourth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HH_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HL_1 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, HH_2, and HL_1 subbands of a second set of chrominance subbands; and

the fourth MQ coder is assigned code-blocks corresponding to HL_1 and LH_1 luminance subbands.

30. The apparatus defined in Claim 29 wherein the plurality of code-blocks is 4:2:2 data.

31. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, and sixth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, LH_3, HL_2, LH_2, HH_2 luminance subbands and a LH_2 subband of a first set of chrominance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, LH_3, and HH_2 subbands of a second set of chrominance subbands and a HH_1 luminance subband;

the third MQ coder is assigned code-blocks corresponding to LL_3, LH_3, and LH_2 subbands of the first set of chrominance subbands and a HL_1 subband of the second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to a HL_3, HH_3 and LH_1 luminance subbands and a LH_2 subband of the second set of chrominance subbands;

the fifth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband and LH_3, HH_3 and LH_2 subbands of the second set of chrominance subbands;

the sixth MQ coder is assigned code-blocks corresponding to a HL_3, HH_3, HH_2, and HL_1 subbands of the first set of chrominance subbands.

32. The apparatus defined in Claim 31 wherein the plurality of code-blocks is 4:2:2 data.

33. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, sixth, seventh, and eighth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, and HH_2 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2, and HH_2 subbands of a second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to a HL_1 luminance subband;

the fifth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband;

the sixth MQ coder is assigned code-blocks corresponding to a HH_1 luminance subband;

the seventh MQ coder is assigned code-blocks corresponding to a HL_1 subband of the first set of chrominance subbands;

the eighth MQ coder is assigned code-blocks corresponding to a HL_1 subband of the second set of chrominance subbands.

34. The apparatus defined in Claim 33 wherein the plurality of code-blocks is 4:2:2 data.

35. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, and fourth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HH_2, and HL_1 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to HH_1 luminance subband and LL_3, HL_3, LH_3, HH_3, and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband and LL_3, HL_3, LH_3, HH_3, and HH_2 subbands of a second set of chrominance subbands; and

the fourth MQ coder is assigned code-blocks corresponding to HL_2 and LH_2 luminance subbands, HL_2 and LH_2 subbands of the first set of chrominance subbands, and HL_2 and LH_2 subbands of the second set of chrominance subbands.

36. The apparatus defined in Claim 35 wherein the plurality of code-blocks is 4:1:1 data.

37. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, and sixth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, HL_2, LH_2 and HH_2 subbands of a second set of chrominance subbands;

the fourth MQ-coder is assigned code-blocks corresponding to a HL_1 luminance subband;

the fifth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband; and

the sixth MQ coder is assigned code-blocks corresponding to a HH_1 luminance subband.

38. The apparatus defined in Claim 37 wherein the plurality of code-blocks is 4:1:1 data.

39. The apparatus defined in Claim 21 wherein the plurality of MQ coders comprises first, second, third, fourth, fifth, sixth, seventh, and eighth MQ coders, wherein

the first MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, and HH_2 luminance subbands;

the second MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3, and HH_2 subbands of a first set of chrominance subbands;

the third MQ coder is assigned code-blocks corresponding to LL_3, HL_3, LH_3, HH_3 and HH_2 subbands of a second set of chrominance subbands;

the fourth MQ coder is assigned code-blocks corresponding to a HL_2 luminance subband, a HL_2 subband of the first set of chrominance subbands, and a HL_2 subband of the second set of chrominance subbands;

the fifth MQ coder is assigned code-blocks corresponding to a LH_2 luminance subband, a LH_2 subband of the first set of chrominance subbands, and a LH_2 subband of the second set of chrominance subbands;

the sixth MQ coder is assigned code-blocks corresponding to a LH_1 luminance subband;

the seventh MQ-coder is assigned code-blocks corresponding to a HL_1 luminance subband;

the eighth MQ coder is assigned code-blocks corresponding to a HH_1 luminance subband.

40. The apparatus defined in Claim 39 wherein the plurality of code-blocks is 4:1:1 data.